



STATE OF NEVADA
DEPARTMENT OF HUMAN RESOURCES

HEALTH DIVISION

505 East King Street
Carson City, Nevada 89710

RICHARD H. BRYAN
Governor

JERRY GRIEPENTROG
Director

September 11, 1987

Kathleen Schneider
State, Local and Indian Tribe Programs
Office of Governmental and Public Affairs
United States Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mrs. Schneider:

Enclosed is amendment 9 to the Nevada Radioactive Material License No. 13-11-0043-02, issued to U.S. Ecology, Inc. I have also included copies of the four lists of authorized solidification, stabilization and absorbent agents and high-integrity containers which are referenced in the amendment.

The lists were not made a part of the license in order to facilitate list revision. You can see that the original lists have already been revised due to typographical errors and other required corrections to make them comparable to the lists incorporated into the Washington license.

If you have any questions, please feel free to contact me.

Sincerely,

A handwritten signature in cursive script, appearing to read "Stanley R. Marshall".

Stanley R. Marshall, Supervisor
Radiological Health Section
Bureau of Regulatory Health Services

SM/cd5/USEA9NRC.LTR

Enclosure

cc: Jack Hornor, Region V, U.S. Nuclear Regulatory Commission

9102080282 901110
PDR FDIA
KARMAZI 0-523 PDR

A/10

NEVADA STATE HEALTH DIVISION
RADIOACTIVE MATERIAL LICENSE
SUPPLEMENTARY SHEET

License Number 13-11-0043-02
Amendment 9

U.S. Ecology, Inc.
P.O. Box 7246
Louisville, KY 40207

In accordance with letter dated June 23, 1985(6), signed by E. D. Martinez and letters dated October 31, 1986, May 21, 1987 and May 27, 1987, signed by R. B. Rittenberg, Nevada Radioactive Material License No. 13-11-0043-02 is amended as follows:

TO CHANGE:

Condition 24 (7)(b) and (c) to read:

- 24.B. The licensee may accept radioactive waste for burial provided the waste has been absorbed or solidified utilizing absorbant materials or solidification agents specified by the Health Division.
- 24.C. A site user must certify in writing to the licensee that wastes delivered for burial contain no more free-standing liquid than one percent of the waste volume when the waste is buried in a container designed to ensure stability or 0.5 percent of waste volume when the waste is processed for burial in a stable form.
-

NEVADA STATE HEALTH DIVISION

RADIOACTIVE MATERIAL LICENSE

SUPPLEMENTARY SHEET

License Number 12-11-0042
Amendment 9

TO ADD:

-
- 25.A. High-integrity containers (HIC) may be buried at the site provided container design specifications area not exceeded. Example: Burial no deeper than 25 feet for containers tested for 25-foot burial depth is required.
- B. All HICs must be equipped with passive vent designs. A site user delivering HICs to the site for burial must certify to the licensee the HIC type. HIC containers shall be buried no deeper than permitted by passive vent specifications. Example: Burial no deeper than 25 feet for containers with passive vents tested for 25-foot burial depths is required.
- C. It is the responsibility of the person processing liquid waste into a solid form to adhere to a quality control to verify the waste form is appropriate. If a material can also be used as a sorbent, the restrictions noted for its use shall apply to its use as a solidification agent.
- D. Only those stabilization media which have been evaluated or are in the process of being evaluated and are used with the stability guidance requirements of the U.S. Nuclear Regulatory Commission's Low-Level Licensing Branch Technical Position on Waste Form may be accepted by the Health Division.
26. Waste containers inspected for liquids will be tested only in the bottom of the trench where the waste will be buried when there is no precipitation and no winds exceeding 25 mph.

NEVADA STATE HEALTH DIVISION

RADIOACTIVE MATERIAL LICENSE
SUPPLEMENTARY SHEETLicense Number 13-11-0043-02

27. All containers will be subject to testing for ^{Amendment 9} Compliance with Chapter 459.830-459.8305 of the Nevada Administrative Code, and as specified by the licensee except high integrity containers or other packages with external radiation levels in excess of 100 mRem/hr.
28. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents including any enclosures, listed below. Chapter 459 of the Nevada Administrative Code shall govern unless the statements, representations and procedures in the licensee's application and correspondence are more restrictive than the regulations.
- A. Letter dated June 23, 1985(6), signed by E. D. Martinez.
- B. Letter dated October 31, 1986, signed by R. B. Rittenberg.
- C. Letter dated May 21, 1987, signed by R. B. Rittenberg.
- D. Letter dated May 27, 1987, signed by R. B. Rittenberg.

GEORGE E. REYNOLDS, M.D.
ACTING STATE HEALTH OFFICER
FOR THE NEVADA STATE HEALTH DIVISION

By Stanley R. Marshall
Stanley R. Marshall, Supervisor
Radiological Health Section

Date July 24, 1987

RICHARD H. BRYAN
Governor

STATE OF NEVADA

LAWRENCE F. MATHEIS
Administrator

JERRY GRIEPENTROG
Director

JOSEPH Q. JARVIS, M.D.
Health Officer



DEPARTMENT OF HUMAN RESOURCES

HEALTH DIVISION

Radiological Health Section

505 East King Street, Room 203

Carson City, Nevada 89710

(702) 885-5394

September 1, 1987

Authorized Stabilization Media
Revision 1

1. Aztech (General Electric)
2. Bitumen* (ATI and Waste Chem)
3. Chem-Nuclear Cement
4. Concrete
5. Dow Media (Vinyl Ester Styrene)
6. Envirostone (U.S. Gypsum Cement)
7. Westinghouse - LN Technologies Cement
8. Stock Equipment Cement
9. Hittman Grout
10. Other stabilization media and processes which have been reviewed and approved by U.S. NRC and/or the Health Division as meeting waste form stability criteria.

* Note: Oxidized Bitumen only

** Note: Concrete, when used as an encapsulation medium around small volume of radioactive material, e.g., a sealed source centered in a fifty-five gallon drum containing concrete, shall have a formulated compressive strength greater than or equal to 2500 psi.

RICHARD H. BRYAN
Governor

JERRY GRIEPENTROG
Director

STATE OF NEVADA



LAWRENCE F. MATHEIS
Administrator

JOSEPH Q. JARVIS, M.D.
Health Officer

DEPARTMENT OF HUMAN RESOURCES

HEALTH DIVISION

Radiological Health Section

505 East King Street, Room 203

Carson City, Nevada 89710

(702) 885-5394

September 1, 1987

Authorized Solidification Media Revision 1

1. Aztech (General Electric)
2. Aquaset I and II
3. Bitumen* (Waste Chem and ATI)
4. Chem-Nuclear Cement
5. Concrete (Structural)
6. Delaware Custom Media
7. Dow Media
8. Envirostone
9. Petroset I and II
10. Safe T Set
11. Westinghouse-LN Technologies Cement
12. Other solidification media and processed which have been approved by U.S. Nuclear Regulatory Commission and/or the Health Division.

* Note: For waste types that require solidification, both oxidized bitumen and straight distilled are acceptable.

Solidification means a resultant waste form which is a free standing solid and primarily relies upon a chemical reaction of encapsulation to contain the liquid. Authorized stabilization media may also be used as solidification agents without conducting tests necessary to verify stability provided the resulting waste form is a free standing solid.

It is the responsibility of the person processing the waste into a solid form to adhere to a quality control program to verify the waste form is appropriate. If a material can also be used as a sorbent, the restrictions noted for its use as an authorized absorption agent shall apply to its use as a solidification agent.

RICHARD H. BRYAN
Governor

STATE OF NEVADA

LAWRENCE P. MATHEIS
Administrator

JERRY GRIEPENTROG
Director

JOSEPH Q. JARVIS, M.D.
Health Officer



DEPARTMENT OF HUMAN RESOURCES

HEALTH DIVISION

Radiological Health Section

505 East King Street, Room 203

Carson City, Nevada 89710

(702) 885-5394

September 1, 1987

Authorized High Integrity Containers
Revision 1

Manufacturer

Pacific Nuclear
Nuclear Packaging
Chichibu Cement
Chichibu Cement

Package
Identification
Number

DSHS-HIC-TMI-01
DSHS-HIC-EA-50
DSHS-HIC-SFPIC 200L
DSHS-HIC-SFPIC 400L



DEPARTMENT OF HUMAN RESOURCES

HEALTH DIVISION

Radiological Health Section

505 East King Street, Room 203

Carson City, Nevada 89710

(702) 885-5394

September 1, 1987

AUTHORIZED ABSORPTIONS AGENTS
Revision 1

Only those absorbents listed below are acceptable for general use in packaging and/or processing radioactive liquids or with materials that may contain quantity of liquid that requires absorbing.

Absorbing efficiencies and quantity of absorbent required vary. In all cases, it is the responsibility of the site user to determine the efficiency and proper proportions of an absorbent for liquids being absorbed. Note: Absorbent materials must be provided to absorb at least twice the volume of radioactive liquid contents.

	<u>Media</u>	<u>Oil</u>	<u>Water</u>
A.	Clay Materials		
1.	Speedi Dri	Approved	Approved
2.	Hi Dri	Not Approved	Approved
3.	Florco	Approved	Approved
4.	Florco X	Not Approved	Approved
5.	Instant Dri	Not Approved	Approved
6.	Safe T Sorb	Not Approved	Approved
7.	Opalex	Approved	Approved
B.	Diatomaceous Earths		
1.	Superfine	Approved	Approved
2.	Floor Dry	Approved	Approved
3.	Celetom	Approved	Approved
4.	Safe N Dri	Approved	Approved
5.	Solid-A-Sorb	Approved	Approved

	<u>Media</u>	<u>Oil</u>	<u>Water</u>
C.	Perlite		
1.	Chemsil 30	Not Approved	Approved
2.	Chemsil 50	Approved	Approved
3.	Chemsil 3030	Approved	Approved
4.	Dicaperl HP200	Approved	Approved
5.	Dicaperl HP500	Approved	Approved
D.	Others		
1.	Dicalite Dicasorb	Approved	Not Approved
2.	Petroset**	Approved**	Approved***
3.	Petroset II**	Approved	Approved
4.	Aquaset**	Not Approved	Approved
5.	Aquaset II**	Not Approved	Approved
6.	Safe T Set	Not Approved	Approved

* Not for use with pure water.

** Note: The products Aquaset, Aquaset II, Petroset and Petroset II shall only be used without an inner 4 mil plastic liner. Additionally, these products when used in accordance with the manufacturer's procedures incorporate the requirement of enough absorbent material to absorb at least twice the volume of radioactive liquid content.

*** Note: the product Petroset is primarily used in conjunction with Petroset II or Aquaset II when a mixture of water and oils are present and the oils are in excess of five percent of the waste volume. Use of Petroset requires power mixing equipment.

NEVADA STATE HEALTH DIVISION

RADIOACTIVE MATERIAL LICENSE
SUPPLEMENTARY SHEET

11/13/87
U.S. Ecology, Inc.
P.O. BOX 7246
Louisville, KY 40207

License Number 13-11-0043-02
Amendment 10

In accordance with letter dated September 28, 1987, signed by Robert B. Rittenberg, Nevada Radioactive Material License No. 13-11-0043-02 is amended as follows:

TO CHANGE:

Condition 24 (7)(f) to read:

- 24.7. The licensee shall not accept radioactive waste for disposal which:
- f. Is in the form of resin or filter media which has been dewatered and contains greater than 0.5 percent by waste volume noncorrosive free-standing liquid.

TO ADD:

- 29.E. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents including any enclosures, listed below. The Nevada Administrative Code (NAC) shall govern unless the statements, representation, and procedures in the licensee's application and correspondence are more restrictive than the regulations.
- A. Letter dated June 23, 1985(6), signed by E.D. Martinez.
- B. Letter dated October 31, 1986, signed by R. B. Rittenberg.
- C. Letter dated May 21, 1987, signed by R. B. Rittenberg.
- D. Letter dated May 27, 1987, signed by R. B. Rittenberg.
- E. Letter dated September 18, 1987, signed by R. B. Rittenberg.

\ramb\usecoa10\

JOSEPH Q. JARVIS, M.D.
HEALTH OFFICER

FOR THE NEVADA STATE HEALTH DIVISION

By *Stanley R. Marshall*

STANLEY R. MARSHALL, SUPERVISOR

RADIOLOGICAL HEALTH SECTION

Date NOVEMBER 13, 1987.

A/11

RICHARD H. BRYAN
Governor

JERRY GRIEPENTROG
Director

STATE OF NEVADA



LAWRENCE P. MATHEIS
Administrator

JOSEPH Q. JARVIS, M.D.
Health Officer

DEPARTMENT OF HUMAN RESOURCES

HEALTH DIVISION

Radiological Health Section

505 East King Street, Room 203

Carson City, Nevada 89710

(702) 885-5394

November 2, 1988

Steve Carpenter
Vice President - Operations
U.S. Ecology, Inc.
P.O. Box 7246
Louisville, KY 40207

Dear Mr. Carpenter:

Enclosed is Amendment 12 of Nevada Radioactive Material License No. 13-11-0043-02, issued to U.S. Ecology, Inc. The amendment is issued as a result of our discussions and correspondence relating to renewal of the license for operation of the low-level radioactive waste disposal site near Beatty, NV.

The enclosed amendment does not renew the license in its entirety. The amendment is intended to confirm the agreement by U.S. Ecology, Inc. of the submittal dates and details of the three primary remaining components of the application for license renewal which have not been received by this office. The amendment also establishes a new license expiration date.

If you have any questions, please feel free to contact me.

Sincerely,

A handwritten signature in cursive script, appearing to read "Stanley R. Marshall".

Stanley R. Marshall, Supervisor
Radiological Health Section
Bureau of Regulatory Health Services

1w2\USEA12.LTR

Enclosures

A/12

cc: Bert Gray
Bill Schneider
Ron Lange
Jerry Griepentrog
Jack Hornor, Region V, NRC
~~Kathy~~ Schneider, NRC - Washington, D.C.

NEVADA STATE HEALTH DIVISION

RADIOACTIVE MATERIAL LICENSE
SUPPLEMENTARY SHEET

U.S. Ecology, Inc.
P.O. Box 7246
Louisville, KY 40207

License Number 13-11-0043-02
Amendment No. 12

In accordance with letter dated October 4, 1988, signed by J.J. Scoville, Nevada Radioactive Material License No. 13-11-0043-02 is amended as follows:

TO CHANGE:

-
4. Expiration Date: June 30, 1980 to:
Expiration Date: December 31, 1989
-

TO ADD:

-
- 29.A. The licensee shall submit a complete Geological and Hydrologic Site Characterization Report to the Division on or before November 7, 1988.
- B. The report must include details concerning the direction and rate of flow of the underground water below the site.
- 30.A. The licensee shall submit a new Site Closure Plan to the Division on or before January 1, 1989, which addresses and resolves all Division comments concerning the previous site closure plan.
- B. The plan must include the measures the licensee will take to prevent access to buried low-level radioactive waste by any inadvertent intruder.
- C. The plan must indicate how the licensee will stabilize the site to minimize the cost of long term care and maintenance.

NEVADA STATE HEALTH DIVISION

RADIOACTIVE MATERIAL LICENSE

SUPPLEMENTARY SHEET

License Number 13-11-0043-02
Amendment No. 12

Conditions continued...

- D. The plan must include the estimated costs of closure of the site in full conformance with the provisions of NAC 459.010 to 459.950, inclusive.
- E. The plan must identify and include details concerning the type of sureties the licensee will provide to the Division to cover the costs of closure of the site.
- 31.A. The licensee shall submit a complete Dose Model and Pathway Analysis Report to the Division on or before March 31, 1989.
- B. The report must include a comprehensive monitoring plan for the collection of suitable environmental samples at appropriate locations to determine concentrations of radioactive materials migrating from the site via all possible pathways of release.
- C. The report must include the date the licensee will have the monitoring program operational, and the date sampling will begin for determining radioactive material migration from the site via any possible pathway.
- D. The report must include procedures that can be instituted which will mitigate the migration of radioactive materials from the site via any possible pathway, and the estimated costs of the procedures.

11w2\usea12.txt

JOSEPH Q. JARVIS, M.D., MSPH
STATE HEALTH OFFICER
FOR THE NEVADA STATE HEALTH DIVISION

By

Stanley R. Marshall
STANLEY R. MARSHALL, SUPERVISOR
RADIOLOGICAL HEALTH SECTION

Date NOVEMBER 2, 1988

Page 1 of 2 Pages

13190

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
RADIOACTIVE MATERIAL LICENSE

Pursuant to the Atomic Energy and Radiation Control Act, Section 13-7-40 et. seq. of S.C. Code of Laws of 1976, as amended, and Supplements thereto, and the South Carolina Department of Health and Environmental Control Regulation 61-63, Radioactive Material (Title A), and in reliance on statements and representations heretofore made by the applicant, a license is hereby issued authorizing the licensee to receive, acquire, possess and transfer radioactive material listed below; and to use such radioactive material for the purpose(s) and at the place(s) designated below. This license is subject to all applicable rules and regulations of the South Carolina Department of Health and Environmental Control now or hereafter in effect and to any conditions specified below.

Amendment No. 45 amends

LICENSEE		3. License Number
<p>1. Name Chem-Nuclear Systems, Inc. Barnwell Waste Management Facility A Subsidiary of Waste Management, Inc.</p> <p>2. Address P.O. Box 726 Barnwell, S.C. 29812</p>	<p>097 in its entirety.</p>	
		4. Expiration Date
		December 31, 1992
5. Radioactive Material (Element and Mass Number)	6. Chemical and/or Physical Form	7. Maximum Radioactivity and/or quantity of ma- terial which licensee may possess at any one time.
<p>A. Any radioactive material excluding source material and special nuclear material.</p> <p>B. Source material.</p>	<p>A. Dry packaged radio- active waste except as authorized in this license.</p> <p>B. Dry packaged radio- active waste except as authorized in this license.</p>	<p>A. 50,000 curies.</p> <p>B. 60,000 pounds.</p>

8. Authorized Use:

A and B.

Radioactive material as low-level radioactive waste may be received, stored, and disposed of by shallow land burial. The licensee shall comply with all applicable terms and conditions of the Southeast Interstate Low-Level Radioactive Waste Management Compact and Section 5 of the Low-Level Radioactive Waste Policy Amendments Act of 1985 (P.L. 99-240), regarding volume limitations and allocation of disposal capacity; provided however, the licensee shall not receive an

9402060389 25PP

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Material License
Supplementary Sheet

License Number 097Amendment No. 45

annual volume of more than one million, two hundred thousand (1.2 million) cubic feet of waste per calendar year beginning January 1, 1985; however, the licensee is authorized to increase the volume in ten (10) per centum increments in accordance with the provisions of Section 5 (a) (3) (b) of the Low-Level Radioactive Waste Policy Amendments Act of 1985; provided the Department is notified in writing no later than thirty (30) days in advance of such increases.

Unless otherwise authorized by the Department, only radioactive waste consigned for burial shall be received at the location specified in Condition No. 9 of this license. The maximum radioactivity and/or quantity of radioactive material indicated in Item 7. A and B applies only to above ground activities.

General Conditions

9. Unless otherwise specified, the authorized place of use is a site located approximately five miles northwest of Barnwell, South Carolina, in the Seven Pines School District, Red Oak Township, Barnwell County, South Carolina, within the boundary of the land area described in Lease Agreement dated April 6, 1976, as amended.
10. The licensee shall comply with the provisions of Department Regulation 61-63, Radioactive Material, (Title A), Part I - General Provisions; Part II - Licensing of Radioactive Materials; Part III - Standards for Protection Against Radiation; Part VI - Notices, Instructions, and Reports to Workers; Inspections, and Part VII - Licensing Requirements for Land Disposal of Radioactive Waste; Department Regulation 61-83, Transportation of Radioactive Waste Into or Within South Carolina.
11. Operations authorized by this license shall be conducted in accordance with Chem-Nuclear Systems, Inc. procedures and subsequent revisions and additions approved by the Department. However, the licensee may, upon notification to the Department but without Department approval, make minor changes to these procedures provided that:
 - a. The change does not affect requirements of any other license condition in this license;

Page _____ of _____ Pages

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Material License
Supplementary Sheet

License Number _____ 097
Amendment No. _____ 45

General Conditions continued

- b. The change does not increase the potential for personnel exposure;
- c. The change does not diminish operational safety;
- d. The change does not increase the potential for release of radioactive material to unrestricted areas; and
- e. The change does not reduce the licensee's record keeping and reporting system.

The licensee shall maintain records of these changes including evaluations which provide the basis for the change.

- 12. Operations shall be conducted by or under the supervision of: John S. Zawacki, Joseph J. Still, George Hurst, Michael T. Ryan (RPO), William B. House or other individuals designated by the licensee's Radiation Protection Officer upon successful completion of the licensee's training program.
- 13. The licensee shall, to the extent necessary, continue the employment of all personnel involved in the operation of the Barnwell Waste Management Facility in accordance with all requirements of the license and applicable regulations and, in the event replacement of employees becomes necessary, only individuals of comparable qualifications and experience will be hired.
- 14. The licensee shall insure that all site personnel have satisfactorily completed the training program requirements as specified in the Chem-Nuclear Systems, Inc. Barnwell Site Training Program. Changes and additions to the program shall be submitted to the Department for review. Time intervals for personnel indoctrination, training, examination, certification, retraining specified in Standard Operating Procedures S20-AD-004, "Barnwell Radioactive Waste Burial Site Personnel Training" shall not be changed without Department approval.
- 15. A documented weekly inspection of site operations and the restricted area of the site for compliance with applicable conditions of this license shall be conducted by a named designee in Condition 12.

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Material License
Supplementary Sheet

License Number 097

Amendment No. 45

General Conditions Continued

16. The transportation of radioactive materials and radioactive waste within the State of South Carolina shall be in accordance with applicable regulations of the U.S. Department of Transportation, the U.S. Nuclear Regulatory Commission, Section RHA 2.22, Department Regulations 61-63, Radioactive Material, (Title A), and Department Regulation 61-83, "Transportation of Radioactive Waste Into or Within South Carolina."
17. The licensee shall maintain all records and shipment manifests pertinent to the transportation, receipt, and disposal of radioactive material at the location specified in Condition 9 of this license until authorization is given by the Department for transfer of disposal of such records.
18. The licensee shall maintain a record for each shipment of waste disposed of at the site. As a minimum, the record shall include:
 - a. the date of disposal of the waste;
 - b. the location of waste in the disposal site;
 - c. the condition of the waste packages received;
 - d. any discrepancy between the waste listed on the shipment manifest or shipping papers and the waste received in the shipment;
 - e. a description of any evidence of leaking or damaged packages or radiation or contamination in excess of applicable regulatory limits; and
 - f. a description of any repackaging operations of any of the waste packages in the shipment.
19. A monthly site receipt and burial activities report shall be submitted no later than the 10th day of the following month to the Chief, Bureau of Radiological Health, S.C. Department of Health & Environmental Control, 2600 Bull Street, Columbia, South Carolina 29201.

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Material License
Supplementary Sheet

License Number 097Amendment No. 45

General Conditions Continued

20. Except as specifically provided otherwise by this license, the licensee shall possess and use radioactive material described in Items 5, 6, and 7 of this license and conduct site operations in accordance with statements, representations, operating procedures, and disposal criteria, heretofore made by the licensee or his authorized representative in application for and subsequent to issuance of S.C. Radioactive Material License No. 097, and amendments thereto.
21. Unless otherwise specified in this license, the licensee shall make no changes in the personnel training program, the internal safety audits, Safety Review Board, ALARA Review Committee, Site Criteria, or Procedures Manual and Standard Operating Procedures, without approval from the Department.

Receipt, Acceptance and Inspection Conditions

22. The licensee shall not accept radioactive waste for storage or disposal unless the shipper has completed the required information for the waste shipment on a Barnwell Waste Management Facility's Radioactive Shipment Manifest form or approved equivalent. Such form or revisions thereto shall be approved by the Department.
23. The licensee shall not accept radioactive waste for storage or disposal unless the shipper of such waste has a valid, unsuspended Radioactive Waste Transport Permit issued by the S.C. Department of Health and Environmental Control.
24. The licensee shall not accept radioactive waste for storage or disposal unless the shipper has provided a properly executed Department Form, DHEC-803, Radioactive Waste Shipment Certification Form, Part I and II. For shipments consisting of more than 75 cubic feet or containing more than one (1) curie shall also be accompanied by a properly completed and executed Department Form, DHEC-802, Radioactive Waste Shipment Prior Notification and Manifest Form.
25. The licensee shall only accept radioactive waste shipments for storage or disposal which have been inspected by a representative of the Department.

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Material License
Supplementary Sheet

License Number 097

Amendment No. 45

26. Notwithstanding other conditions of this license, the licensee shall not accept radioactive waste for storage or disposal unless he has received advance written notification of any waste shipment containing unusual hazards or potential hazards including but not limited to, physical, gaseous, chemical, pyrophoric, or excessive removable contamination on disposal containers shipped inside casks or excessive internally contaminated casks, and unexpected high radiation levels at disposal container surfaces.
27. The licensee shall immediately notify the Department or the Department's on-site representative of any waste shipments where a violation of applicable regulations or license conditions has been found.
28. The licensee shall notify the shipper and the Department when any shipment of radioactive waste or part of a shipment has not arrived within 60 days after the advance copy of the shipment manifest or snipping papers was received by the licensee.
29. The licensee shall notify the shipper when it has been determined that a radioactive waste shipment or part of a shipment cannot be accepted for disposal by the licensee.
30. The licensee shall acknowledge receipt of the waste within 7 days of its acceptance for disposal by returning a signed copy of the shipment manifest or shipping papers to the shipper. The licensee shall indicate on the returned copy of the shipment manifest or shipping papers any discrepancy between waste descriptions listed on the manifest or papers and the waste materials received in the shipment.

Waste Characteristics and Waste Form Conditions

31. The licensee shall not accept any radioactive waste for storage or disposal unless the shipper has marked each package, as specified by the licensee, to identify its classification as either Class A, stable or unstable, Class B, or Class C waste, and certifies that the waste materials have been classified and prepared for disposal in accordance with the following waste classification table:

Page _____ of _____ Pages

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Material License
Supplementary Sheet

License Number 097

Amendment No. 45

Waste Classification Table

CONCENTRATION LIMITS IN CURIES/
CUBIC METER

RADIONUCLIDES

Table I (long-lived)

	<u>Class A</u>	<u>Class B</u>	<u>Class C</u>
C-14.....	≤ 0.8		≤ 8
C-14 in activated metal.....	≤ 8		≤ 80
Ni-59 in activated metal.....	≤ 22		≤ 220
Nb-94 in activated metal.....	≤ 0.02		≤ 0.2
Tc-99.....	≤ 0.3		≤ 3
I-129.....	≤ 0.008		≤ 0.08

CONCENTRATION LIMITS IN NANOCURIES/GRAMS

Alpha emitting transuranics with half-life greater than 5 years...	≤ 10	≤ 100
Pu-241.....	≤ 350	≤ 3500
Cm-242.....	≤ 2000	≤ 20000

Table II (short-lived)

CONCENTRATION LIMITS IN CURIES/
CUBIC METER*

Class A Class B Class C

Total of all with half-life less than 5 years.....	≤ 700	≤ 700	
H-3.....	≤ 40	≤ 40	
Co-60.....	≤ 700	≤ 700	
Ni-63.....	≤ 3.5	≤ 70	≤ 700
Ni-63 in activated metal.....	≤ 35	≤ 700	≤ 7000
Sr-90.. ..	≤ 0.04	≤ 150	≤ 7000
Cs-137.....	≤ 1	≤ 44	≤ 4600

* curies/cubic meter is equivalent to microcuries/cubic centimeters.

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Material License
Supplementary Sheet

License Number 097

Amendment No. 45

Condition 31. continued

- a. The concentration of a radionuclide or radionuclide mixture may be averaged over the volume of the waste and, if used, the solidification agent or matrix if the waste form is a homogeneous mixture. The concentration of radionuclides in filters/sealed sources encapsulated with a solidification agent or matrix shall be averaged over the volume of the filters/sealed sources not the solidification agent. The volume of packaging, containers, liners or overpacks shall not be included in this calculation, nor shall the volume of the waste mixture be artificially increased by the addition of non-disperable solids or objects even if considered as waste.
- If expressed in units of nanocuries per gram, concentrations may be averaged over the weight of the waste and, if used, the solidification agent if homogeneous, except in the case of encapsulated filters which shall be over the weight of the filter. The weight of packaging containers, liners or overpacks shall not be included in this calculation, nor shall the weight of the waste mixture be artificially increased by the addition of heavy, non-disperable solids or objects even if considered as waste.
- b. The waste is Class A if none of the listed radionuclides are present. Radium waste as authorized by Condition 44 of this license shall be Class A, stable or unstable.
- c. There are no upper limits in Class B waste for the first three (3) radionuclides listed.
- d. There are no Class B values for the last nine (9) radionuclides listed; their presence classifies the waste as either Class A or Class C according to their concentrations.
- e. The waste class for mixtures of the listed radionuclides is determined by deriving for each radionuclide the ratio between its concentration in the mixture and its concentration limit in the table and adding the resulting ratio values for each radionuclide group. All limits used in the calculation must be for the same waste class. The sum of the ratios for each radionuclide group must be less than 1.0 or the waste is of a higher classification than that used for the calculation.

Page 2 of 40 Pages

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Material License
Supplementary Sheet

License Number 097

Amendment No. 45

- f. If Class C limits are used in the calculation and the sum of ratios for either group is equal to or exceeds 1.0, the waste is not acceptable for disposal without prior written approval from the Department.
- g. If concentrations for any single radionuclide exceed the Class C values in the table, the waste is not acceptable for disposal without prior written approval from the Department.
32. A. Unless otherwise specified in this license, the licensee shall not receive any liquid radioactive waste regardless of the chemical or physical form. Absorbent materials may be placed in packages of dry, solid waste to absorb unintentional and incidental amounts of liquids. Further, liquids in the interstitial spaces of transport casks and containers shall be removed to the extent practical.
- B. Solidified radioactive waste shall have no detectable free standing liquids in excess of one-half percent (0.5%) by waste volume of non-corrosive liquids per container.
- C. In lieu of the requirements of paragraph B. above, solidified waste containing non-corrosive liquids in excess of one-half percent (0.5%) by waste volume, and less than one percent (1%) noncorrosive liquids by waste volume, may be received and disposed of in high integrity containers approved by the Department.
33. A. Unless otherwise specified, the licensee shall only receive aqueous liquids and other applicable waste forms which have been solidified or otherwise stabilized with one of the following solidification media:
1. Vinyl Ester Styrene
 2. Cement
 3. Bitumen (see Subparagraph E. below)
 4. Vinyl Chloride
- B. Solidification media and processes used to stabilize Class A aqueous liquids and other applicable waste forms containing isotopes with greater than five (5) year half-lives having a total specific activity of all these isotopes of 1 microcurie/cubic centimeter or greater, and all applicable Class B and C waste, shall meet and have been evaluated in accordance with the "Stability Guidance" requirements of the U.S. Nuclear Regulatory Commission's Low-Level Licensing Branch, Technical Position on

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Material License
Supplementary Sheet

License Number 097

Amendment No. 45

Waste Form, dated May 1983, or other evaluation criteria specifically approved by the NRC or the Department.

- C. Solidified Class A aqueous liquids and other applicable waste forms with a specific activity of less than 1 microcurie/cubic centimeter, shall meet the requirements of the "Solidified Class A Waste Products" of the NRC Branch Technical Position on Waste Forms, dated May 1983.
- D. Other solidification media and processes shall be acceptable for which a topical report has been prepared and received approval from the U.S. Nuclear Regulatory Commission, and final approval by the Department.
- E. The licensee shall only receive for disposal, full formula, oxidized bitumen (asphalt) solidified waste, and certified as such by the waste generator. Regardless of the waste classification, bitumen solidified waste received for disposal shall be a free-standing monolith and shall not demonstrate the characteristic of a free flowing, viscous fluid.

The licensee shall dispose of bitumen solidified waste in trenches commensurate with the applicable waste classification, and in all cases, provide sufficient backfill material to fill all voids around the waste to provide structural stability and minimize trench subsidence. The licensee may construct segregated trenches for disposal of bitumen waste provided approval is granted by the Department.

- 34. Except as specifically provided in this license, the licensee shall not accept liquid radioactive waste packaged in absorbent materials, or where absorbent materials have been used to absorb liquids rather than properly solidified with an approved media.
- 35. Regardless of the waste classification of Condition 31, and unless otherwise authorized by the Department, the licensee shall not receive evaporator bottoms or concentrates, residues, sludges, or other waste which may contain free standing liquids, unless they are solidified in accordance with Condition 33, and meet the requirements as specified in Condition 32.

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Material License
Supplementary Sheet

License Number 097

Amendment No. 45

36. The licensee may receive resins and filter media in a dewatered form provided that the free standing liquid requirements of Condition 32 and the requirements of Condition 38 are met.
37. The licensee shall not receive containers of ion exchange resins or filter media (dewatered or solidified) unless records of complete radiological analyses (quantitative and qualitative) are provided. The records must specify the specific activity of each radionuclide expressed in microcuries/cubic centimeter and transuranic radionuclides in nanocuries/gram.
38. Regardless of the waste classification of Condition 31, ion exchange resins and filter media containing isotopes with greater than five (5) year half-lives having a specific activity of all these isotopes of 1 microcurie/cubic centimeter or greater must be stabilized by solidification in accordance with Condition 33 and meet the free standing liquid requirements of Condition 32.B. However, in lieu of solidification, the Department will authorize disposal of these waste forms meeting the free standing liquid requirements of Condition 32.C. in approved high integrity containers or other approved methods of stabilization.
39. A. The licensee shall not receive solidified Class A waste containing isotopes with greater than five (5) year half-lives having a totally specific activity of all these isotopes of 1 microcurie/cubic centimeter, and Class B and C waste, unless it is structurally stable and provides reasonable assurance that the waste will maintain its general physical dimensions and its form under the expected disposal condition, which include the weight of soil overburden and compaction equipment, the presence in the burial environment of moisture and microbial activity, and factors internal to the waste itself such as radiation effects and chemical changes.
- B. Structural stability can be provided by the waste form itself if it is a solid monolith, processing the waste to a stable form or placing the waste in a high integrity container that provides stability after disposal. Such containers shall have prior approval of the Department. Polyethylene high integrity containers which serve to provide stability for Class B and C wastes must additionally be placed in a Departmentally approved concrete overpack, which are to be provided by the site operator.

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Material License
Supplementary SheetLicense Number 097Amendment No. 45

- C. Void spaces within the waste and between the waste and its packaging shall be reduced to the extent practicable, but in no case shall less than eighty-five percent (85%) of the capacity of the containers be filled for Class A Stable, Class B and Class C waste unless placed in a High Integrity Container or in a concrete overpack. The licensee may allow a variance from this condition in certain instances, but only after receiving a written justification from the waste generator prior to receiving the waste shipment. Variance justifications and approvals shall be maintained for review by the Department.
40. Except as specified in the waste classification table of Condition 31 of this license, the licensee shall not receive waste containing any transuranic radionuclides. Radioactive waste containing transuranic radionuclides specified in Condition 31 are acceptable provided that the transuranic radionuclides are evenly distributed within a homogeneous waste form and are incidental to the total radioactivity. This license does not authorize the receipt of disposal of components or equipment primarily contaminated with transuranic radionuclides, on vehicles, equipment, or components, with contamination limits in excess of those specified in Condition 55 in a controlled environment.
41. Household or industrial smoke or gas detectors containing Americium-241 foils which may exceed the transuranic radionuclide limit specified in Condition 31 of this license may be accepted for disposal provided the entire detector is received for disposal.
42. The licensee shall not receive or dispose of sealed sources or special form radioactive materials containing more than 5 curies of radioactive material with half-lives greater than 5 years except in a container which provides long term containment. Such containers are subject to approval by the Department. Irradiated metal components which have similar characteristics of special form radioactive materials are subject to Department review for disposal container requirements.
43. The licensee shall not receive toluene, xylene, dioxane, scintillation liquids which exhibit hazardous properties or other organic liquids or solids with similar chemical properties or containers which have at any time contained any of the liquids mentioned above. However, after complete incineration, the ash and/or residue from these wastes are acceptable notwithstanding the requirements of Condition 45 of this license, unless otherwise authorized by the Department.

Page _____ of _____ Pages

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

Radioactive Material License

Supplementary Sheet

License Number 097

Amendment No. 45

-
44. Unless otherwise authorized by the Department the licensee shall not receive any radioactive waste containing Radium except for:
- a. Radium contained in solid homogeneous waste forms in which the Radium activity is incidental to the total activity and the concentration of Radium has not been technologically enhanced or,
 - b. Radium contained in the following devices: self-luminous dials, hands of dials, timepieces, compasses, and electron tubes provided that the entire device is received and buried, or
 - c. Radium contained in biological research waste.
45. The licensee shall not receive radioactive waste in the forms of incinerator ash or powder which may be dispersable unless solidified with a media specified in Condition 33 of this license, or packaged to prevent dispersion as specifically approved by the Department. In lieu of solidification, these waste forms may be received in high integrity containers approved by the Department, provided the waste is stabilized with a binding matrix.
46. The licensee shall not receive waste containing chelating agents with concentrations greater than 8 percent by weight. Radioactive waste containing chelating agents within the range of 0.1 to 8 percent by weight shall not be accepted by the licensee unless stabilized by solidification with a media specified in Condition 33 of this license. The concentration limits apply to wastes prior to solidification; dilution by solidification media is not allowable. Wastes containing chelating agents shall be segregated from Class B and C wastes by at least ten (10) feet in the all directions in the burial trench. Use of a Departmental approved concrete overpack constitutes adequate separation.
47. The licensee may only receive gaseous radioactive materials of Krypton 85 and Xenon 133 for burial provided they meet the following criteria:
- a. Burial containers must be U.S. Department of Transportation specification cylinders or U.S. Nuclear Regulatory Commission approved sealed sources.
 - b. Internal pressure of containers may not exceed 1.5 atmospheres.
 - c. Total activity of containers shall not exceed 100 curies each.

Page 01 of 7 pages

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Material License
Supplementary Sheet

License Number 097

Amendment No. 45

-
48. A. Unless otherwise authorized, the licensee shall not receive for storage nor disposal any mixed low-level radioactive waste defined as waste that satisfies the definition of low-level radioactive waste specified in the Low-Level Radioactive Waste Policy Amendments Act of 1985 (P.L. 99-240), and contains waste that either (1) is listed as hazardous waste in Subpart D, 40 CFR 261, or (2) causes the waste to exhibit any of the hazardous waste characteristics identified in Subpart C, 40 CFR Part 261.
- B. The licensee may however receive waste that has been treated by acceptable methods to render it nonhazardous and therefore not subject to the jurisdiction of the Resource Conservation and Recovery Act (RCRA). Waste which may contain discrete quantities of hazardous or toxic materials may be evaluated for disposal by the licensee and such evaluations provided to the Department for consideration of approval.
49. The licensee shall not receive radioactive waste that is readily capable of detonation or of explosive decomposition or reaction at normal pressures and temperature, or of explosive or exothermic reaction with water.
50. The licensee shall not receive radioactive waste which contains or is capable of generating quantities of toxic gases, vapors, or fumes harmful to persons transporting, handling or disposing of the waste. This does not apply to radioactive gaseous waste packaged in accordance with Condition 47 of this license.
51. The licensee shall not receive or dispose of any pyrophoric material or flammable solids. These materials contained in wastes shall be treated, prepared and packaged to be nonflammable and the final waste form rendered nonpyrophoric and nonflammable prior to transportation and receipt.
52. The licensee shall not receive or bury oil or petroleum based materials in any physical form. However, this does not prohibit the receipt and disposal of waste containing incidental or trace amounts of oil or petroleum based materials which have been absorbed, provided that the amount of absorbed oil and petroleum based materials does not exceed one percent (1%) by waste volume in a container.

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Material License
Supplementary Sheet

License Number 097

Amendment No. 45

53. The licensee shall not receive radioactive waste containing hazardous biological, pathogenic, or infectious material unless treated to reduce to maximum extent practicable the potential hazard from the materials. In addition, radioactive waste containing biological, pathogenic, or infectious material shall be doubly packaged in new or properly recertified 17-H DOT specification containers or equivalent as follows:
- a. First, the inner container having a capacity of 55-gallon or less shall have a water tight liner at least 4 mils thick hermetically sealed after filling.
 - b. The biological material shall be thoroughly layered in the inner container in a ratio of thirty (30) parts biological material to at least one (1) part slaked lime and ten (10) parts absorbent, which shall be agricultural grade 4 vermiculite or medium grade diatomaceous earth, by volume. The addition of formaldehyde is strictly prohibited.
 - c. The closure on the inner container shall be made with a 16-lug closing tool or standard lid with securely attached ring and bolt. Lever locks are not acceptable.
 - d. The outer container, 55-gallon capacity for a 30-gallon inner container, or 83-gallon capacity for a 55-gallon inner container, shall be filled initially with at least 4 inches of absorbent material, specified in b., the inner container in an upright position, and the remaining volume filled with the absorbent material; then securely closed and properly sealed.
 - e. Containers of small capacity may be used provided that the volume of the outer container is at least 1.5 times the volume of the inner container.

Contamination Limit Conditions

54. For receipt at the Barnwell Site, all shipments shall comply with contamination control limits as prescribed in U.S. Department of Transportation Regulations, 49 CFR 173.443.

Page _____ Pages _____

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Material License
Supplementary Sheet

License Number 097

Amendment No. 45

Enclosed radioactive material transport vehicles used solely for transporting radioactive materials and marked "For Radioactive Material Use Only" and accessible surface of transport casks and trailers shall not be released from the site if contamination limits exceed the following:

- a. Fixed contamination of 10 mR/hr on contact with the interior surface or 2 mR/hr at 1 meter from the interior surface.
- b. Removable contamination of 2200 dpm/100 sq. cm. Beta-gamma or 220 dpm/100 sq. cm. Alpha. This applies to interior and exterior surfaces.
- c. Fixed contamination of 0.5 mR/hr on contact with any exterior surface.

Internally contaminated (fixed or removable) shipping casks released from the site are subject to applicable shipping regulations of the U.D. Department of Transportation. The licensee shall also inform the recipient of such casks in advance of the contaminated nature of the cask. Records of such notifications shall be retained for review by the Department.

55. Vehicles used solely for transporting radioactive material and are not marked "For Radioactive Material Use Only" shall not be released from the site if the contamination limits exceed the following:
 - a. Fixed contamination of 0.5 mR/hr at any accessible surface.
 - b. Removable contamination of 2200 dpm/100sq. cm. Beta-gamma, or 220 dpm/100sq. cm. Alpha.
56. Vehicles or items for unrestricted use shall not be released from the site if the contamination limits exceed the following:
 - a. Fixed contamination of 0.1 mR/hr at any accessible surface.
 - b. Removable contamination of 220 dpm/100sq. cm. Beta-gamma, or 22 dpm/100sq. cm. Alpha.
57. The licensee shall perform sandblasting for decontamination purposes on vehicles, equipment, or components, with contamination limits in excess of those specified in Condition 55 in a controlled environment.

Page _____ of _____ Pages

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Material License
Supplementary Sheet

License Number 097

Amendment No. 45

-
58. The licensee shall not use its vehicle wash-down facility for any vehicles or equipment with removable contamination limits in excess of those specified in Condition 55 unless specifically approved by the Department.

General Packaging Conditions

59. All radioactive waste shall be packaged and loaded in accordance with applicable U.S. Department of Transportation Regulations, U.S. Nuclear Regulatory Commission Regulations 10 CFR Part 71, the requirements of this license, and the disposal site criteria.
60. Unless otherwise authorized, all radioactive waste shall be received and buried in closed containers. Containers which have been altered, and solidification or encapsulation media intended to serve as containers or container closures, are not acceptable unless approved by the Department. Loose radioactive waste and solidification residuals within shipping casks are prohibited.
- ~~51.~~ The licensee shall not receive any package to be used as the final burial container that is corroded to the point of degradation or damaged. Any package used as the final burial container shall be of such material and construction that there will be no significant chemical, galvanic, or other reaction among the packaging components, or between the packaging components and the package contents.
62. The licensee shall, to the extent practicable, repair or repackage any damaged package used as the final burial container if such packages are approved for acceptance by the Department.
63. Prior to burial, the licensee shall, to the extent practicable, remove all liquids from waste packages found in excess of allowable limits if such packages are approved for acceptance by the Department.
64. The licensee shall not receive shipments of radioactive materials unless appropriate lifting devices of sufficient length have been provided and securely attached to containers and palletized shipments within a cask.

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Material License
Supplementary Sheet

License Number 097

Amendment No. 45

65. The licensee is not authorized to open any packages at its facility, except for the following:
- a. For purposes of repairing or repackaging damaged containers.
 - b. For purposes of inspecting to insure compliance with this license.
 - c. For purposes of returning outer shipping containers.
 - d. For purposes of confirming package contents.

Site Design, Construction and Maintenance Conditions

66. Construction of waste burial trenches shall be in accordance with CNSI Procedure S20-AD-008, "Trench Construction" Class A waste trenches will be constructed in accordance with Drawing No. B-215-D-004, "Class A Trench Construction Details." Class B/C waste trenches will be constructed in accordance with Drawing No. B-215-D-007, "Class B/C Trench Construction Details." Any changes to these drawings, specifications, or procedures must have approval from the Department before implementation.
67. The licensee shall not begin construction of any trench prior to approval of the Department as to location, trench bottom elevation and intended use.
68. The licensee shall not initiate burial operations in newly excavated trenches until the Department has inspected and approved the trenches. An initial inspection will be made by the Department upon completion of excavation of the trench, sumps, french drain inside the trench, drainage ditches adjacent to the trench and installation of sumps and standpipes. An intermediate inspection will be made by the Department after the french drain and sumps have been filled. A final inspection will be made by the Department upon completion of construction. Trench backfill and completion shall be performed in accordance with CNSI Procedure S20-AD-008, "Trench Construction."
69. Construction of slit trenches shall be in accordance with CNSI Drawing No. B-215-D-0011, "Slit Trench Construction Details." Trench backfill and completion shall be performed in accordance with CNSI Procedure S20-AD-008, Trench Construction. An initial inspection shall be made by the Department at the completion of excavation, and final inspection shall be made at the completion of construction before burial begins.

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Material License
Supplementary Sheet

License Number 097Amendment No. 45

70. A. Backfilling shall be performed for each trench design in accordance with CNSI Procedure S20-AD-008. Completed trenches shall at no time be used for stockpiling large volumes of earth not withstanding provisions for a final grading plan.
- B. The licensee shall design trench covers to minimize to the extent practicable water infiltration, to direct percolating or surface water away from the disposed waste, and to resist degradation by surface geologic processes and biotic activity.
71. Open trenches to include trenches under construction and partially filled trenches shall be protected to prevent runoff water from entering trenches. Radioactive waste shall not be placed into trench areas where water has accumulated. Burial of radioactive waste into trenches with unusual amounts of water shall immediately cease until the origin of water has been determined and corrective action taken.
72. The licensee shall use proper surface water management techniques on the site to insure that:
- Erosion is minimized.
 - Surface runoff is directed away from the trenches.
 - Accumulation of standing water is minimized.
 - Standing water in the immediate disposal area is prevented.
73. All monitoring wells, sumps, disposal tubes, and protrusions into the trenches, shall be sufficiently capped or covered to prevent the introduction of extraneous material or infiltration of water. All well and sump pipes shall be protected from damage.
74. The licensee shall, at least monthly, perform an inspection of completed trenches to ascertain any erosion, settling, cracking, subsidence, or loss of ground cover grasses and make corrections immediately. Documentation of the inspection findings and all repairs even if the repairs were performed as a routine maintenance function shall be made and incorporated into a permanent record and submitted with the stabilization plan for final site closure.

Page _____ of _____ P7/623

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Material License
Supplementary Sheet

License Number 097

Amendment No. 45

-
75. The licensee shall initiate closure and stabilization measures as each trench is filled and covered. Interim or final grades shall be established and seeding of trench covers shall commence at no more than one year following final trench burial operations. Active waste disposal operations must not have an adverse effect on completed closure and stabilization measures.
76. The licensee shall use any reasonable means, including but not limited to fencing and security personnel, to prevent unauthorized entry into the restricted area of the site.
77. The boundaries and locations of each disposal trench shall be accurately located and mapped by means of a land survey. Temporary trench boundary markers and trench identification markers shall be erected upon completion of backfill operations until permanent markers are installed.
78. A series of markers, one at the end of each completed trench and on each corner, shall be installed upon completion of the seeding of trench covers. End monuments shall be constructed of granite. Trench corner markers shall be constructed in accordance with CNSI Drawing No. B-215-C-0010. The following information shall be inscribed on the end monument, and this information shall be reported to the Chief, Bureau of Radiological Health, S.C. Department of Health and Environmental Control, 2600 Bull Street, Columbia, S.C. 29201:
- a. Total activity of radioactive material in curies total amount of source material in pounds, and total amount of special nuclear material in grams in the trench.
 - b. Date of completion of the burial operations; and
 - c. Volume of waste in the trench.

Burial Operation Conditions

79. Unless specifically authorized by the Department, the licensee shall not exhume previously buried waste.

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Material License
Supplementary Sheet

License Number 097

Amendment No. 45

-
80. Wastes designated as Class A, unstable, pursuant to Condition 31 of this license, and solidification Class A waste which do not meet the stability requirements of Condition 33.B., must be segregated from other wastes by placing in a separate disposal trench or by other methods specifically approved by the Department which will minimize trench subsidence and achieve long-term stability to eliminate ongoing active site maintenance.
 81. Wastes designated as Class C pursuant to Condition 31 of this license, shall be disposed of so that the top of the waste is a minimum of 5 meters below the top surface of the cover or shall be disposed of with intruder barriers that are designed to protect against an inadvertent intrusion for at least 500 years. Such intruder barrier designs must be specifically approved by the Department.
 82. The licensee shall handle and emplace packages of radioactive waste in disposal trenches in such a manner that maintains packaging integrity during handling, emplacing, and subsequent backfilling. Waste packages deposited in trenches shall be protected from any adverse operations which may cause damage to them.
 83. The licensee shall emplace radioactive waste packages in such a manner to minimize voids between packages and permits voids between packages to be filled with earth to reduce future trench subsidence.
 84. Licensee personnel shall wear appropriate protective clothing, apparatus, and gloves at all times while handling or disposing of radioactive waste.
 85. The licensee shall be a "Registered User" of all licensed casks delivered to the site containing radioactive waste for disposal.
 86. At least one health physics technician shall be present during all waste handling, offloading and disposal operations.
 87. The licensee shall maintain radiation levels at the edge of open trenches at or below 100mR/hr.
 88. Uncovered waste shall not extend more than 100 ft. beyond the back-filled portion of the trench.

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Material License
Supplementary Sheet

License Number 097

Amendment No. 45

-
89. The licensee shall bury containers of Krypton 85 and Xenon 133 gaseous radioactive materials in upright positions in the trench with a minimum spacing of ten (10)ft. between gas containers.
90. Unless specifically authorized, the licensee shall not store any package containing radioactive waste for a period greater than six months from the date of receipt of the package prior to burial. Radioactive waste shall not be stored in the trench area or an open environment for a period greater than ten (10) days from receipt, and shall be protected from damage and inclement weather conditions.

91. Deleted

Environmental Surveillance Conditions

92. The licensee shall conduct an on-site monitoring and environmental monitoring program capable of detecting the potential contribution of radioactive material and hazardous constituents from the site to the environment. The monitoring program shall be performed in accordance with CNSI Procedures - Barnwell Site.
93. Should any samples taken from the monitoring wells, or air samples reveal increases in the concentration of radioactive material which were determined prior to commencement of the burial operations, the licensee shall perform further surveys to determine whether or not the increase is due to the land burial operations. The licensee shall notify the Chief, Bureau of Radiological Health, S.C. Department of Health and Environmental Control, within 48 hours of any such increases.
94. The licensee shall submit results of all scheduled environmental sampling and analysis to the Department quarterly.
95. Monitoring wells in clusters will be placed outside the trenches but in the trench area. Specific locations shall be determined through consultation. The initial well of a cluster will be core drilled to the water table and a representative sample of the core shall be submitted to the Department. The depth and number of additional wells in the cluster are to be determined by the geotechnical observations in the initial core. All wells shall be grouted, sealed and capped.

License Number 097Amendment No. 45Site Closure & Stabilization Conditions

96. As radioactive material buried may not be transferred by abandonment or otherwise, unless specifically authorized by the Department, the expiration date of this license applies only to the above ground activities and to authority to bury radioactive material wastes at the site specified in Condition 9. The license continues in effect and the responsibility and authority for possession of buried radioactive material wastes continues until the Department finds that the plan established for preparation of the Barnwell Site for transfer to another person has been satisfactorily implemented in a manner to reasonably assure protection of the public health and safety and the Department takes action to terminate the licensee's responsibility and authority under this license. All requirements for environmental monitoring, site inspection, maintenance and site security continue whether wastes are being buried or not.
97. The licensee shall develop a site closure and stabilization plan that addresses, as a minimum, the following performance objectives:
- a. Bury all waste in accordance with the requirements of the license.
 - b. Dismantle, decontaminate, as required, and dispose of all structures, equipment, and materials that are not to be transferred to the site custodian.
 - c. Document the arrangements and the status of the arrangements for orderly transfer of site control and for long term care by the government custodian. Also document the agreement, if any, of state or federal governments to participate in, or accomplish, any performance objective. Specific funding arrangements to assure the availability of funds to complete the site closure and stabilization plan must be made.
 - d. Direct gamma radiation from buried wastes should be essentially background.
 - e. Demonstrate by measurement and/or model during operations and after site closure that concentrations of radioactive material which may be released to the general environment in ground water, surface water, air, soil, plants, or animals will not result in an annual dose exceeding an equivalent of 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ of any member of the public.

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Material License
Supplementary Sheet

License Number 097

Amendment No. 45

-
- f. Render the site suitable for surface activities during custodial care. Planned custodial care may be limited to activities such as vegetation control, minor maintenance, and environmental monitoring. However, use of the site surface for activities such as parking lots may be planned. Final conditions at the site must be acceptable to the government custodian and compatible with its plan for the site.
 - g. Demonstrate that all trench elevations are above water table levels taking into account the complete history of seasonable fluctuations.
 - h. Eliminate the potential for erosion or loss of site or trench integrity due to factors such as groundwater, surface water, wind, subsidence, and frost action. For example, an overall site surface water management system must be established for humid sites to drain rainwater and snowmelt away from the burial trenches. All slopes must be sufficiently gentle to prevent slumping or gullying. The surface must be stabilized with established short rooted grass, rock, riprap, or other measures. Trench caps must be stabilized to minimize erosion, settling, or slumping of caps.
 - i. Demonstrate that trench markers are in place, stable, and keyed to benchmarks. Identifying information must be clearly and permanently marked.
 - j. Compile and transfer to the Department complete records of site maintenance and stabilization activities, trench elevation and locations, trench inventories, and monitoring data for use during custodial care for unexpected corrective measures and data interpretation.
 - k. Establish a buffer zone surrounding the site sufficient to provide space to stabilize slopes, incorporate surface water management features, assure that future excavation on adjoining areas would not compromise trench or site integrity, and provide working space for unexpected mitigating measures in the future. The buffer zone must also be transferred to the custodial agency. The buffer zone may generally be less than 300 feet but not less than 100 feet.

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Material License
Supplementary Sheet

License Number 097

Amendment No. 45

-
- l. Provide a secure passive site security system (e.g., a fence) that requires minimum maintenance.
 - m. Stabilize the site in a manner to minimize environmental monitoring requirements for the long-term custodial phase and develop a monitoring program based on the stabilization plan.
 - n. Investigate the causes of any statistical increases in environmental samples which have occurred during operation and stabilization. In particular, any evidence of unusual or unexpected rates or levels of radionuclide or hazardous constituent migration in or with the groundwater must be analyzed and corrective measures implemented.
 - o. Eliminate the need for active water management measures, such as sump or trench pumping and treatment of the water to assure that wastes are not leached by standing water in the trenches.
 - p. Evaluate present and zoned activities on adjoining areas to determine their impact on the long-term performances of the site and take reasonable action to minimize the effects.
98. A preliminary plan for preparation of the site for transfer to another person who would only passively hold the site shall be submitted for review. The plan shall be consistent with Condition 97 of this license and shall include demonstration that funds are being set aside or other measures being taken are adequate to finance the site closure plan. The plan shall also include preliminary estimates of costs, environmental impacts, data needs, personnel needs, material and equipment needs, planned documentation and quality assurance, and detailed plan for trench locations and elevations, expected capacities, planned surface contours, and buffer zones.
99. A reassessment of current operating practices shall be submitted. The reassessment shall consider the objectives of the site plan specified in Condition 98 and any changes in operation at the site which would enhance implementation of the plan.
100. The licensee shall submit an updated plan and operational assessment every five (5) years for review.

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Material License
Supplementary Sheet

License Number 097

Amendment No. 45

101. One (1) year prior to the anticipated transfer of the site and buried radioactive materials to another person (including an agency of the U.S. Government) the licensee shall submit a final version of the site preparation plan including a schedule for implementation of all remaining elements prior to transfer, and a description of the mechanics of orderly transfer in coordination with the transferee.

Date of Issuance January 1, 1990

For The South Carolina Department
of Health And Environmental Control

BY: Wayward G. Shealy
Wayward G. Shealy, Chief
Bureau of Radiological Health

unlabeled

MATERIALS LICENSE

CHEM-NUCLEAR SYSTEMS, INC.

3003 BUTTERFIELD ROAD
OAK BROOK, ILLINOIS 06512

License No. 12-12536-01

Amendment No. 23

License Number 12-13536-01 is amended in its entirety to read as follows:

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438); and 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material;" a license is hereby issued to Chem-Nuclear Systems, Inc., 3003 Butterfield Road, Oak Brook, Illinois 06521, to receive, possess, store, and dispose of Special Nuclear Material by burial at its facility near Barnwell, South Carolina.

This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to the provision of 10 CFR Part 20, "Standards for Protection Against Radiation," other applicable rules, regulations, and orders of the U.S. Nuclear Regulatory Commission now or hereafter in effect and to the following conditions:

8406110180 12pp.

A/7

General Conditions

1. The Licensee is hereby authorized to receive, possess, and store prior to disposal by burial in the ground Special Nuclear Material up to the following quantities:

- (a) U-235 contained in Uranium enriched in the U-235 isotope, not to exceed 4500 grams. No package or bulk shipment of waste shall contain more than 350 grams of U-235.

- (b) U-233 contained in Uranium enriched in the U-233 isotope, not to exceed 200 grams.

This condition does not limit the total quantity of aforementioned Special Nuclear Material which may be disposed of by burial in the ground.

2. These activities are authorized to take place at the Licensee's facility located approximately 5 miles northwest of Barnwell, South Carolina.
3. Except as specifically provided otherwise by this license, the Licensee shall receive, possess, store and dispose of by burial in the ground Special Nuclear Material described in this license in accordance with statements, representations, and procedures contained in application and letter dated December 20, 1979, letter dated October 29, 1980, letter dated August 6, 1982, in Chem-Nuclear Systems, Inc. Standard Operating Procedures, and in accordance with the Barnwell Waste Management Facility Site Disposal Criteria.
4. Operations shall be conducted by or under the supervision of: John S. Zawacki, Joseph J. Still, George Hurst, Michael T. Ryan (Radiation Protection Officer), or other individuals designated by the Licensee's Radiation Protection Officer upon successful completion of the Licensee's training program (Chem-Nuclear Systems, Inc. Standard Operating Procedure S20-AD-004).
5. The Licensee shall maintain all records and shipment manifests pertinent to the transportation, receipt, and disposal of Special Nuclear Material at the location specified in Condition 2 of this license until authorization is given by the Director, Division of Waste Management, U.S. Nuclear Regulatory Commission (U.S.N.R.C.)

and South Carolina Department of Health and Environmental Control, Bureau of Radiological Health (S.C.D.H.E.C.) for transfer or disposal of such records.

6. The Licensee shall maintain a record for each shipment of Special Nuclear Material disposed of at the site. As a minimum, the record shall include:
 - (a) The date of disposal of the Special Nuclear Material;
 - (b) The location of the Special Nuclear Material in the disposal site;
 - (c) The condition of the package containing Special Nuclear Material as received;
 - (d) Any discrepancy between materials listed on the shipment manifest or shipping papers and the materials received in the shipment;
 - (e) A description of any evidence of leaking or damaged packages containing Special Nuclear Material or radiation levels or contamination in excess of applicable regulatory limits; and
 - (f) A description of any repackaging operations of any packages containing Special Nuclear Material.

7. The Licensee shall submit an annual report on site receipt and burial activities by the end of the first calendar quarter each year for the preceding year. This report shall include, as a minimum, the following information for each shipment of Special Nuclear Material:
 - date of disposal
 - name of generator
 - location in the disposal site (trench number)
 - grams of Special Nuclear Material
 - volume of the package
 - waste class determined in accordance with 10 CFR 61.55, and to the extent practicable;

 - total volume of Special Nuclear Material received and buried by waste class.

Receipt and Acceptance Conditions

8. The Licensee shall accept for disposal at the site only Special Nuclear Material which is packaged and prepared in accordance with NRC regulations, DOT regulations, and the conditions of this license.
9. The Licensee shall not accept Special Nuclear Material for storage or disposal unless the shipper has provided for the Special Nuclear Material shipment on a Barnwell Waste Management Facility's Radioactive Shipment Manifest form.
10. The Licensee shall also require before acceptance of any Special Nuclear Material (SNM) waste shipment that:
 - (a) The shipper of such waste has a valid, unsuspended Radioactive Waste Transport Permit issued by the Department of Health and Environmental Control of The State of South Carolina.
 - (b) Each shipment of SNM waste delivered to the site is accompanied by a properly executed Radioactive Waste Shipment Certification Form, Part I and Part II.
 - (c) Any SNM shipment consisting of more than 75 cubic feet or containing more than one (1) curie shall also be accompanied by a properly completed and executed Radioactive Waste Shipment Prior Notification and Manifest Form.
11. Any SNM shipment in which there is evidence that Special Nuclear Material is missing or that the waste packages have been tampered with in transport shall be received by the Licensee and safely stored pending notification by the Licensee of the S.C.D.H.E.C. and the U.S.N.R.C. The Licensee shall not dispose of such packages until authorized by the U.S.N.R.C.
12. The Licensee shall not accept any package containing SNM waste for storage or disposal unless the shipper has marked each package, as specified by the Licensee, to identify its classification as either Class A, stable or unstable, Class B, or Class C waste, and certifies that the waste materials have been classified and prepared for disposal in accordance with, unless otherwise specified in this license or specifically approved by the U.S.N.R.C., the waste classification requirements of 10 CFR 61.55.

Waste Characteristics and Waste Form Conditions

13. Unless otherwise specified in this license or specifically approved by the U.S.N.R.C., the Licensee shall not accept any package containing SNM waste unless the waste materials meet the waste characteristics and waste form requirements of 10 CFR 61.56.
14. The Licensee shall not accept any package containing SNM waste to be used as the final burial container that is corroded or damaged.
15.
 - A. Unless otherwise specified in this license, the Licensee shall not accept any liquid waste containing SNM regardless of the chemical or physical form. Absorbent materials may be placed in packages of dry, solid waste to absorb unintentional and incidental amounts of liquids.
 - B. Solidified waste containing SNM shall have no detectable free standing liquids containing SNM in excess of one-half percent (0.5%) by waste volume of non-corrosive liquids per container.
 - C. In lieu of the requirements of paragraph B. above, solidified SNM waste containing non-corrosive liquids in excess of one-half percent (0.5%) by waste volume and less than one percent (1.0%) non-corrosive liquids by waste volume, may be accepted and disposed of in high integrity containers approved by the S.C.D.H.E.C.
16.
 - A. The Licensee shall only accept aqueous liquids and other applicable waste forms containing SNM which have been solidified or otherwise stabilized with one of the following solidification media:
 1. Vinyl Ester Styrene
 2. Cement
 3. Bitumen
 - B. Solidification media and processes used to stabilize Class A aqueous liquids containing SNM and other applicable waste forms containing isotopes with greater than five (5) year half-lives having a total specific activity of all these isotopes of 1

microcurie/cubic centimeter or greater and containing SNM, and all applicable Class B and C waste containing SNM, shall meet and have been evaluated in accordance with the "Stability Guidance" requirements of the U.S. Nuclear Regulatory Commission's Low-Level Licensing Branch, Technical Position on Waste Form, dated May 1983, or other evaluation criteria specifically approved by the U.S.N.R.C. or the S.C.D.H.E.C.

- C. Solidified Class A aqueous liquids and other applicable waste forms containing SNM with a specific activity of less than 1 microcurie/cubic centimeter, shall meet the requirements of the "Solidified Class A Waste Products" of the NRC Branch Technical Position on Waste Forms, dated May 1983, or other evaluation criteria specifically approved by the U.S.N.R.C. or the S.C.D.H.E.C.
 - D. Other solidification media and processes for wastes containing SNM shall be acceptable which have received approval from the U.S.N.R.C. and the S.C.D.H.E.C.
17. Except as otherwise specified in this license, the Licensee shall not accept liquid waste containing SNM packaged in absorbent materials, or where absorbent materials have been used to absorb liquids rather than properly solidified with an approved media, unless otherwise approved by the U.S.N.R.C. or the S.C.D.H.E.C.
18. Except as specified in the waste classification requirements of Condition 12 of this license, the Licensee shall not accept SNM waste containing transuranic radionuclides. SNM waste containing transuranic radionuclides are acceptable provided that the transuranic radionuclides are evenly distributed within a homogenous waste form and are incidental to the total radioactivity. This condition does not authorize the receipt and disposal of components or equipment primarily contaminated with transuranic radionuclides.
19. The Licensee shall not accept SNM waste containing chelating agents with concentrations greater than 0.1% by weight unless specifically approved by the U.S.N.R.C. The concentration limit applies to wastes prior to solidification.
20. The Licensee shall not accept SNM waste in the forms of incinerator ash or powder which may be dispersible unless solidified with a

media specified in Condition 16 of this license. In lieu of solidification, these waste forms may be received in high integrity containers approved by the S.C.D.H.E.C., provided the waste is stabilized with a binding matrix.

21. The Licensee shall not accept or dispose of oil or lubricants containing SNM waste in any physical form. However, this does not prohibit the receipt and disposal of waste containing incidental or trace amounts of oil which have been absorbed, provided that the amount of oil does not exceed one percent (1%) by waste volume in a container.
22. Regardless of the waste classification requirements of Condition 13 of this license, the Licensee shall not accept evaporator bottoms or concentrates, residues, sludges, or other waste containing SNM which may contain free standing liquids unless they meet the liquid requirements of Conditions 15 and 16 of this license.
23. The Licensee may accept resins and filter media containing SNM in a dewatered form provided that the liquid waste requirements of Conditions 15 and 16 of this license are met.
24. Regardless of the waste classification requirements of Condition 13 of this license, ion exchange resins and filter media containing SNM and containing isotopes with greater than five (5) year half-lives having a specific activity of all these isotopes of 1 microcurie/cubic centimeter or greater must be stabilized by solidification in accordance with Condition 16 of this license and meet the liquid waste requirements of Condition 15 of this license. However, in lieu of solidification, the Licensee may dispose of these wastes meeting the liquid waste requirements of Conditions 15 and 16 of this license in approved high integrity containers or other methods approved by the U.S.N.R.C. and the S.C.D.H.E.C.
25. SNM waste containing biological, pathogenic, or infectious material shall be doubly packaged in new or properly recertified 17-H DOT specification containers or equivalent as follows:
 - (a) First, the inner container having a capacity of 55-gallons or less shall have a water tight liner at least 4 mils thick hermetically sealed after filling.

- (b) The biological material shall be thoroughly layered in the inner container in a ratio of thirty (30) parts biological material to at least one (1) part slaked lime and ten (10) parts absorbent, which shall be agricultural grade 4 vermiculite or medium grade diatomaceous earth, by volume. The addition of formaldehyde is strictly prohibited.
 - (c) The closure on the inner container shall be made with a 16-lug closing tool or standard lid with securely attached ring and bolt. Lever locks are not acceptable.
 - (d) The outer container, 55-gallon capacity for a 30-gallon inner container, or 83-gallon capacity for a 55-gallon inner container shall be filled initially with at least 4 inches of absorbent material, specified in b., the inner container in an upright position, and the remaining volume filled with the absorbent material; then securely closed and properly sealed.
 - (e) Containers of small capacity may be used provided that the volume of the outer container is at least 1.5 times the volume of the inner container.
26. SNM waste containing both toxic chemicals and radioactive materials shall not be accepted until an independent evaluation of both hazards has been performed. If the chemical hazard exceeds the radiological hazard, the waste shall not be buried except as specifically approved by the S.C.D.H.E.C. Records of hazard evaluation of such SNM wastes shall be kept for inspection by the S.C.D.H.E.C. and the U.S.N.R.C.
27. The Licensee shall not accept SNM wastes containing toluene, xylene, dioxane, scintillation liquids or other organic liquids with similar chemical properties or containers which have at any time contained any of the liquids mentioned above. However, after complete incineration, the ash and/or residue from these wastes are acceptable which meet the requirements of Condition 20 of this license.

Site Operations Conditions

28. All SNM waste handling and disposal operations at the Barnwell facility, including off-loading, repackaging and overpacking operations, shall be conducted in restricted areas.
29. The Licensee shall conduct an audit program at the Barnwell facility in accordance with CNSI procedure: Internal Audit Procedure (CN-AD-014). The Licensee shall also comply with the following conditions in implementation of the audit program:
 - (a) Audit subjects shall include at a minimum the procedures and license listed in Appendix A of this license. Each procedure and license listed shall be audited at least once per year.
 - (b) Copies of audit results and follow-up actions shall be maintained for NRC inspection for a minimum of two (2) years.
30. The Licensee shall not exhume previously buried SNM waste.
31. SNM wastes designated as Class A, unstable, pursuant to the waste classification requirements of Condition 12 of this license and solidified Class A waste not meeting the stability requirements of Condition 16B of this license shall be segregated from other wastes by placing in a separate disposal trench or segregated by other methods approved by the U.S.N.R.C.
32. SNM wastes designated as Class C pursuant to the waste classification requirements of Condition 12 of this license shall be disposed of so that the top of the waste is a minimum of 5 meters below the top surface of the cover or shall be disposed of with intruder barriers that are approved by the U.S.N.R.C.
33. Shipments of bulk solids and waste packages containing not more than 350 grams of U-235 in solid form may be disposed of by land burial under the following conditions:
 - (a) Minimum projected surface area of bulk solid shipment or waste package shall be 2.0 square feet, and
 - (b) The mass per unit area shall not exceed 200 grams of U-235 per

square foot averaged over 2.0 square foot portion of the burial area.

The reference plane for determining compliance with these conditions shall be taken parallel to a common elevation.

34. SNM waste containing chelating agents and approved for disposal under the conditions of this license shall, as a minimum, be segregated from all other Class B and C wastes by at least ten (10) feet in all directions in the burial trench.

Environmental Monitoring Conditions

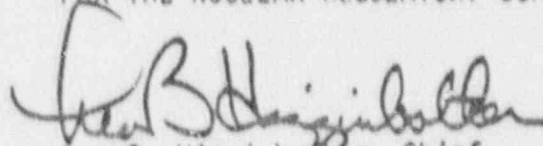
35. The Licensee shall conduct an on-site monitoring and environmental monitoring program capable of detecting the potential contribution of Special Nuclear Material from the site to the environment. The monitoring program shall include the samples and sampling frequency listed in CNSI procedure: Environmental Surveillance Plan (S20-AD-006).
36. Should any samples be taken from the monitoring wells, or air samples reveal increases in concentrations of Special Nuclear Materials which were determined prior to commencement of the burial operations, the Licensee shall perform further surveys to determine whether or not the increase is due to the land burial operations. The Licensee shall notify the U.S.N.R.C. Region II Office and the Chief, Bureau of Radiological Health, South Carolina Department of Health and Environmental Control within 48 hours of such increases.

Site Closure & Stabilization Conditions

37. As buried Special Nuclear Material may not be transferred by abandonment or otherwise, absent specific Commission authorization, the expiration date on this license applies only to the above ground activities and to the authority to receive, possess, store and dispose of licensed material at the facility near Barnwell, South Carolina. The license continues in effect and the responsibility and authority for buried Special Nuclear Material wastes continues until the Commission finds that the plan established for preparation of the Barnwell site for transfer to another person has been satisfactorily implemented in a manner to reasonably assure protection of the public health and safety and the Commission takes action to terminate responsibility and authority of the Licensee under this license. All requirements for environmental monitoring, site inspection and maintenance, and site security continue whether wastes are being buried or not.
38. The Licensee shall submit an updated version of the Preliminary Site Stabilization and Closure Plan for the Barnwell Low-Level Radioactive Waste Disposal Facility and operational assessment every five years as part of the license renewal application.
39. One year prior to the anticipated transfer of the site and buried Special Nuclear Material to another person (including an agency of the U.S. government), the licensee shall submit a final version of the site closure plan including a schedule for implementation of all remaining plan elements prior to transfer, and a description of the mechanics of orderly transfer in coordination with the transferee.

This license shall expire on September 30, 1984.

FOR THE NUCLEAR REGULATORY COMMISSION



Leo B. Higginbotham, Chief
Low-Level Waste and Uranium
Recovery Projects Branch
Division of Waste Management

Date: May 7, 1984

APPENDIX A

PROCEDURES AND LICENSES TO BE AUDITED BY BARNWELL QA COMPONENT

PROCEDURES

Document Storage and Control
Defect Reporting Procedure
Incident Reporting Procedure
Purchasing Procedures and Guidelines
Quality Assurance Records
Control of Special Processes
Control of Measuring and Test Equipment
Training and Indoctrination Program
Test Control
Approved Vendors List
Inspection Program
CNSI ALARA Policy
CNSI Health Physics Policy Manual
Radiation Exposure Records and Procedures
Procurement Document Review by Quality Assurance
Cask/Trailer/Tractor Inspection
Barnwell Site Criteria
Waste Handling and Burial Procedures

LICENSE

Nuclear Regulatory Commission License No. 12-12536-01

Undated

Licensee:

US Ecology, Inc.
9200 Shelbyville Road
Louisville, KY 40257-0146

License Number: 16-19204-01

Amendment Number: Nine (9)
Expiration Date: November 30, 1993
Docket Number: 27-48

Pursuant to the Atomic Energy Act of 1954, as amended; the Energy Reorganization Act of 1974 (PL 93-478); and 10 CFR 70, "Domestic Licensing of Special Nuclear Material"; License No. 16-19204-01 is amended in its entirety. The license, as amended, is issued to US Ecology, Inc., to receive, transport, possess, package, overpack, store, and dispose of special nuclear material (SNM) at its facility located on the U.S. Department of Energy (DOE) Reservation, Benton County, Washington. Under the authority of 10 CFR Part 70, Section 70.14, the U.S. Nuclear Regulatory Commission (NRC) grants an exemption to the licensee from provisions of 10 CFR Part 70, Section 70.24 as they apply to SNM activities authorized under this license.

Except as specifically provided otherwise in this license, the licensee shall receive, transport, possess, package, overpack, store, and dispose of SNM described in this license in accordance with statements, representations, and procedures contained in the application dated July 31, 1985, signed by the Vice President, US Ecology, Inc., and approved by the licensee's Facility Standards Manual (FSM), dated January 13, 1987.

This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to the provisions of 10 CFR Part 19, "Notices, Instructions, and Reports to Workers; Inspections"; 10 CFR Part 20, "Standards for Protection against Radiation"; and all other applicable rules, regulations, and orders of NRC now or hereafter in effect, and to the following conditions:

LICENSE CONDITIONS - GENERAL

1. By the terms of this license, SNM may be received and disposed of at a low-level waste disposal facility located in the southeast corner of Section 9, Township 12 North, Range 26E W.M., Benton County, Washington, Route 4 - USDOE Hanford Reservation, Richland, Washington 99352, within the boundary of the land area described in Sublease Agreement with the State of Washington dated July 29, 1965, as amended. For the purposes of this license, the authorized place of use shall be referred to as the "Richland Facility." The State of Washington, Department of Social and Health Services, is hereafter referred to as the "Department."
2. If a new Facility Manager, Assistant Facility Manager, and Corporate or Facility Radiological Control and Safety Officer is appointed, notification of this shall be provided to the Regional Administrator, NRC, Region V, and the Director, Division of Low-Level Waste Management and Decommissioning, NRC, within 30 days of implementing such appointment.
3. a. The licensee may, upon prior notification to the Director, Division of Low-Level Waste Management and Decommissioning, NRC, but without prior NRC approval and subject to the restrictions contained in part b. of this condition:

~~9006180270~~ 13 pp.

A/8

Nine (9)

27-46

- (1) Make minor changes in the disposal facility as described in the application dated July 31, 1985 and amendments thereto.
 - (2) Make changes in detailed work procedures.
 - (3) Conduct tests or experiments not described in the application dated July 31, 1985 and amendments thereto.
- b. Restrictions for changes, tests, and experiments allowed in Condition 3.a. are as follows:
- (1) The change does not conflict with any other requirement of this license.
 - (2) The change does not increase the exposure of facility personnel to radioactive materials or otherwise cause a decrease in operational safety.
 - (3) The change does not increase the potential for release of radioactive material to unrestricted areas or cause a decrease in the protection of public health or safety of individuals in unrestricted areas, now or in the future.
 - (4) The change does not affect any portion of a procedure which is directly referenced in the FSM.
 - (5) The change does not increase contamination of the environment by radiological material.
- c. (1) The licensee shall maintain records of any changes made pursuant to this condition. Such records shall include written safety and environmental evaluations which provide the basis for the determination that the change is not in violation of the restrictions outlined in Condition 3.b.(1) to (5) above. The licensee shall furnish to the Regional Administrator, NRC, Region V, with a copy to the Director, Division of Low-Level Waste Management and Decommissioning, NRC, within 30 days after the changes, tests, or experiments, a report containing a description of such changes, tests, or experiments, including a summary of the safety and environmental evaluation of each.
- (2) Changes, tests, or experiments exceeding the restrictions of Condition 3.b. shall not be executed unless authorized by license amendment.
4. A monthly facility receipt and burial activities report shall be submitted no later than the 15th day of the following month to the Branch Chief, Operations Branch, Division of Low-Level Waste Management and Decommissioning, NRC. The report shall include, as a minimum, the following information for each shipment:
- a. name and address of the generator(s); broker (if any); and shipper;
 - b. grams of SNM, as received for disposal;

Mine (9)

27-48

- c. total activity of each SNM radionuclide, in millicuries;
 - d. class totals of volume and activity of SNM received and buried (total and by generator);
- and to the extent practicable:
- e. type and physical form of the waste;
 - f. chemical form of the waste and solidification/stabilization/sorption agent.

Additionally, the licensee shall furnish to NRC, within 60 days of a specific written request, other selected information contained on shipment manifests not otherwise specifically required here.

CONDITIONS - LICENSED QUANTITIES OF SNM

5. The licensee may possess unburied SNM at the facility, subject to the following restrictions and all other conditions of this license:
- a. The total quantity of unburied SNM at the facility shall not exceed 5000 grams at any time.
 - b. No single package shall contain more than 100 grams of uranium-235 (U-235), or 60 grams of uranium-233 (U-233), or 600 grams of plutonium (Pu), or any combination thereof, such that the sum of the ratios of the quantity of each SNM radionuclide to the quantities specified herein exceeds unity. Compliance with this requirement shall be determined by the following formula:

$$\frac{\text{grams contained U-235}}{100} + \frac{\text{grams contained U-233}}{60} + \frac{\text{grams contained Pu}}{60} \leq 1$$
 - c. No single package shall contain more than 15 grams of any combination of uranium-235, uranium-233, and plutonium, per cubic foot of total volume. To the extent practicable, the SNM will essentially be uniformly distributed throughout the waste package.
 - d. The licensee shall accept for disposal only waste which has been classified in accordance with 10 CFR Section 61.55 and certified to meet the waste characteristics requirements in 10 CFR Section 61.56. Manifest descriptions provided by the shippers must address, as appropriate, all nuclides present, not just uranium-235, uranium-233, and plutonium.
6. Each accumulation of packages accepted by the licensee, and temporarily stored above ground awaiting burial, shall contain not more than 500 grams of uranium-235 or 300 grams of uranium-233 or 300 grams of plutonium, or any combination thereof, such that the sum of the ratios of the quantity of each SNM radionuclide to the quantities specified herein does not exceed unity. Compliance with this requirement shall be determined by the following formula:

$$\frac{\overset{M}{\text{Grams contained U-235}}}{500} + \frac{\text{grams contained U-233}}{300} + \frac{\text{grams contained PU}}{300} \leq 1$$

Nine (9)

27-48

Each package or accumulation of packages subject to this limitation shall be stored at least 12 feet from any other package, or accumulation of packages, containing SNM.

GENERAL PACKAGING CONDITIONS

7. All SNM waste shall be packaged, loaded, received, and transported in accordance with all applicable U.S. Department of Transportation (DOT) regulations, NRC regulations, and the conditions of this license. Nothing contained here relieves the licensee from complying with other Federal, State, and local regulations governing other radiological, toxic, or hazardous properties of waste materials.
8. Unless specifically authorized by the NRC, all SNM waste shall be received and buried in closed containers. Unless specifically authorized by the NRC, SNM waste in wooden outer containers shall not be received for disposal.
9. All metal containers shall be secured by an intact, heavy-duty closure device when presented for disposal. Closure devices of open-head metal drums having 55-gallons or greater capacity shall be secured by bolts having 5/8-inch or larger diameters. DOT 7A Type A containers shall be tested by the generator or shall meet the use restrictions contained in "DOT 7A Type A Certification Document," MLM 3245. Appendix A lists examples of those containers.
10. SNM waste shall not be accepted for disposal unless it is packaged in such a manner that waste containers received at the facility do not show:
 - a. Significant deformation;
 - b. Loss or dispersal of contents;
 - c. An increase in the external radiation levels from those recorded on the manifest, within instrument tolerances; or
 - d. Degradation due to rust or other chemical action which results in a loss of container integrity.
11. Void spaces within the SNM waste and between the waste and its package shall be reduced to the maximum extent practicable. Unless specifically authorized by NRC, void spaces in Class A stable, Class B, and Class C waste packages shall be less than 15 percent of the total volume of the disposal package. This requirement does not apply to high integrity containers which have been certified by the Department for use as disposal packages. Nor does this requirement apply to activated metals that are too large to put into high integrity containers. For Class B and Class C waste packages containing activated metals, voids shall be reduced to the extent practicable, and shall be demonstrated to be structurally stable by any of the methods discussed in 10 CFR 61.56(b)(1).
12. The licensee shall not accept SNM-bearing waste unless each such waste package has been:
 - a. Classified in accordance with 10 CFR Section 61.55 and the most recent version of the NRC Technical Position on Radioactive Waste Classification;

Nine (9)

27-48

- b. Marked as either Class A stable, Class A unstable, Class B, or Class C, as identified in the most recent version of the NRC Technical Position on Radioactive Waste Classification; and
 - c. Stabilized, when required by this license, in accordance with:
 - (a) procedures that are described in NRC-approved vendor topical reports on waste form solidification media or high integrity containers; or
 - (b) procedures qualified through a licensee's testing program equivalent to that described in the most recent version of the NRC Technical Position on Waste Form. Only those stabilization media or high integrity containers approved by the Department may be used. Stability may also be achieved by using in the disposal unit, engineered structures that have been approved by the Department.
13. The classification marking required by Condition 12 is in addition to any marking or labeling required by DOT and other NRC regulations, and shall consist of lettering one-half inch high or greater, in a durable color contrasting with the background surrounding the lettering. The classification marking shall be visible on the same side as the radioactive marking or label and in close proximity (within six inches). Waste packages marked "Radioactive," "Limited Quantity," or "Radioactive LSA" (low specific activity) need only one classification marking, whereas waste packages labeled White I, Yellow II, or Yellow III shall have classification markings in close proximity (within six inches) to each label.
 14. Except as allowed under Condition 18, untreated SNM liquids and wet sludges are not allowed for disposal. Liquids bearing SNM shall be rendered noncorrosive (pH range 4 to 11) before treatment. Acceptable treatments are stabilization, solidification, or sorption, depending on waste class. Wet sludges, or slurries, such as evaporator bottoms, shall be noncorrosive and shall be treated by stabilization or solidification. Ion exchange media shall not be treated by sorption.
 15. SNM-bearing liquids treated by stabilization shall be processed in accordance with a process control plan using a stabilization medium approved by the Department. The resulting waste form shall meet the stability requirements of Condition 12 and contain as little free standing and noncorrosive liquid as is reasonably achievable. However, in no case shall the liquid exceed one percent of the volume of the waste when the waste is in a disposal container designed to ensure stability, or 0.5 percent of the volume of waste which has been processed to a stable form.
 16. SNM-bearing liquids treated by solidification shall be processed in accordance with a process control plan using a solidification medium approved by the Department. The resulting waste form shall contain as little liquid as is reasonably achievable, but in no case shall the volume of the liquid exceed 0.5 percent of the volume of the container.
 17. SNM-bearing liquids treated by sorption shall not be received unless:
 - a. A metal outer disposal container is used which meets DOT 7A performance specifications and is equipped with heavy-duty closure devices, as required by Condition 9;

Nine (9)

27-48

- b. The metal container is lined with a minimum of 4 mil plastic liner, except as noted in Appendix B;
 - c. The liquid is contained in enough sorbent material to sorb at least twice the volume of liquid contents;
 - d. Only approved sorbents as listed in Appendix B are used; and
 - e. A quality control program has been used which verifies that the above conditions are met.
18. Class A SNM-bearing liquids in individual units or vials, not to exceed 50 milliliters per vial and used for clinical or laboratory testing, shall not be received for disposal unless:
- a. A metal outer disposal container is used which meets DOT 7A performance specification (see Condition 9);
 - b. The metal disposal container is lined with a minimum of 4 mil plastic liner;
 - c. The individual units are layered in sufficient sorbent material to sorb twice the volume of the liquid; and
 - d. Only approved sorbents as listed in Appendix B are used.
19. SNM-bearing waste containing biological (excluding animal carcasses), pathogenic, or infectious material or equipment (e.g., syringes, test tubes, capillary tubes) used to handle such material, shall be treated to reduce, to the maximum extent practicable, the potential hazard from the nonradiological materials. The inner waste container shall be a metal container meeting either DOT 7A performance specifications or manufactured to DOT 17H specifications and shall be lined with a minimum 4 mil plastic liner, which shall be sealed. The inner waste container shall be placed in an outer metal container meeting DOT 7A performance specifications with a heavy-duty closure device (see Condition 9) and shall have a capacity at least 40 percent greater than the inner container. The void between inner container and outer container shall be completely filled by sorbent material, and the outer container must be sealed. Only approved sorbents, as listed in Appendix B, shall be used.
20. Animal carcasses containing, or contained in, SNM materials shall be packaged in accordance with the following requirements: the biological material shall be layered with absorbent and lime and placed in a metal container meeting either DOT 7A performance specifications or manufactured to DOT 17H specifications, having a heavy-duty closure device (see Condition 9). The inner container shall be sealed and placed in a metal outer container meeting DOT 7A performance specifications, with a heavy-duty closure device, having a capacity at least 40 percent greater than the inner container. The void between the inner container and the outer container shall be completely filled by approved sorbent material, and the outer container must be sealed. Only approved sorbents, as listed in Appendix B, shall be used.

Nine (9)

27-48

21. SNM-bearing waste in gaseous form must be packaged at a pressure that does not exceed 1.5 atmospheres at 20°C. Total activity shall not exceed 100 curies per container. Class A gaseous waste shall be contained within DOT-specification cylinders. NRC approval by license amendment is required to accept gaseous SNM waste for disposal, if it is Class B or C.
22. Incinerator ash containing SNM waste shall be treated in such a manner as to be rendered nondispersible in air, exclusive of packaging.
23. SNM-bearing waste liquids which have a pre-treatment concentration of oil in excess of ten percent by weight, shall be treated by either solidification or stabilization. Dilution by solidification or stabilization media shall not be allowed in determining waste composition. Oil means an organic liquid which is immiscible in water, the disposal of which is not regulated under Federal or State hazardous waste laws or regulations.
24. SNM-bearing waste liquids, which have a pre-treatment concentration of chelating agents in excess of one percent by weight, shall be treated by either solidification or stabilization. Dilution by solidification or stabilization media shall not be allowed in determining waste composition. Chelating agent means amine polycarboxylic acids (e.g., EDTA, DTPA), hydroxy-carboxylic acids and polycarboxylic acids (e.g., citric acid, carboic acid, and glucinic acid), the disposal of which is not regulated under Federal or State hazardous waste laws or regulations.
25. The licensee shall not accept for disposal any plutonium neutron source unless the generator has notified the licensee of the intent to ship such source to the licensee's disposal facility. The notification shall consist of telephone and written notification to the Facility Manager before shipment. The notification shall indicate the isotope, activity, form of the source, a description of the packaging used, and anticipated date of arrival.

RECEIPT, ACCEPTANCE, AND INSPECTION CONDITIONS

26. Any shipment in which there is evidence that SNM is missing, or that the waste packages have been tampered with or damaged in transit, shall be impounded by the licensee for NRC and safely stored pending further action by NRC authorities. In such an instance, the Regional Administrator, NRC Region V, shall be notified within 24 hours. Any waste impounded per this condition does not constitute storage, as the licensee has not yet received the waste.
27. The licensee shall ensure that each radioactive shipment record form used to describe an SNM waste shipment received at the site has at least the following certification properly executed by a representative of the shipper/generator of the waste:

"Certification is hereby given to the U.S. Nuclear Regulatory Commission that this shipment of low-level radioactive waste has been inspected in accordance with the requirements of U.S. NRC License No. 16-19204-01, as amended, within 48 hours prior to shipment; and further certification is made that the inspection revealed no items of non-compliance with all applicable laws, rules, regulations, and license conditions."

Nine (9)

27-48

Date: _____ By: _____

Title and Organization: _____

Address and Telephone: _____

DISPOSAL OPERATION CONDITIONS

28. Unless otherwise specifically authorized by the NRC, or the Department, the licensee is not authorized to open any package containing SNM material at the facility, except for the following:
- For purposes of repairing, repackaging, or overpacking leaking containers or containers damaged in transport, if the material is to be disposed of, or returned to the generator, if required for the protection of the health and safety of the employees or the environment. Records of damaged or leaking packages shall be maintained in accordance with 10 CFR Section 61.80(c).
 - For purposes of routine inspection in the presence of a Department inspector for compliance with 10 CFR Sections 61.56, and 61.57, other applicable Federal and State regulations, or conditions of this license; or
 - For purposes of returning outer shipping containers.
29. Accumulations of waste packages containing SNM in quantities specified in this license shall be disposed of so that there is a minimum of 8 inches of soil or a minimum of 4 feet of non SNM-bearing waste in all directions from any other accumulation of packages containing SNM in quantities specified in this license.

SITE DESIGN AND CONSTRUCTION CONDITION

30. Without specific written approval by license amendment from the NRC to do otherwise, disposal of SNM shall take place in disposal units approved for the disposal of source and byproduct material by the Department.

FACILITY PERFORMANCE REPORTING REQUIREMENTS

31. The licensee shall provide the Director, Division of Low-Level Waste Management and Decommissioning, NRC: (a) within 30 days of the effective date of this license amendment, a comprehensive pathway analysis; (b) by June 1 of each year, a comprehensive annual report of the sample analyses, with statistical and trend analysis, and discussions of all anomalous results and actions taken.
32. The licensee shall submit a facility utilization report to the Director, Division of Low-Level Waste Management and Decommissioning, NRC, within three months of the effective date of this license amendment, and by August 31 of each subsequent year. The report shall provide the information, which relates to SNM disposal, stipulated in Condition 57 of WN-1019-02, Amendment 17.
33. In addition to the annual report required by Condition 32, a historical report of operations shall be submitted to the Director, Division of Low-Level Waste

Nine (9)

27-48

Management and Decommissioning, NRC, by June 30, 1989. The historical report shall include:

- a. Aerial and other photographs of the facility which document the extent and type of disposal throughout the operations history of the facility;
- b. Large scale topographic maps denoting all radiological monitoring/sampling stations and location of radioactive material on the facility;
- c. Volumes of SNM waste disposed of in each disposal unit and an accounting of the total mass, in grams, of SNM; major shipments or large-activity or discrete-quantity sources of SNM, if any, within a disposal unit, shall be noted with anecdotal information, to the extent possible.

By June 30, 1990, the licensee shall report to the Director, Division of Low-Level Waste Management and Decommissioning, NRC, the location and description of all SNM waste disposed at the facility through December 31, 1989. The report shall include the total trench content of each SNM radionuclide.

By June 30, 1989, the licensee shall report to the Director, Division of Low-Level Waste Management and Decommissioning, NRC, the results and analyses of all environmental monitoring related to SNM disposal conducted by or for the licensee since operations began, including appropriate statistical assessments of possible trends, discussion of anomalous results, and actions taken, if any.

CONDITIONS RELATED TO AUTHORITY LIMITATIONS

34. Nothing in this license shall abrogate or diminish the authority of the State of Washington, under its Agreement under Section 274b of the Atomic Energy Act of 1954, as amended, with NRC, to regulate, inspect, or otherwise exercise control of operations, with respect to source and byproduct material, for disposal of that material at the commercial low-level radioactive waste disposal facility at Richland (Hanford).
35. Nothing in this license shall abrogate or diminish the authority of the State of Washington to regulate, inspect, or otherwise exercise control of transportation of source, byproduct, or SNM by the licensee, within the borders of the State of Washington, within the limits of authority relinquished to the State by NRC under Section 274b of the Atomic Energy Act of 1954, as amended, or exercised by the State on behalf of NRC within the limits of any cooperative agreement under Section 274i of the Act, or pursuant to authority granted by DOT or DOE, pursuant to agreements with, or regulations promulgated by, those Federal agencies.
36. The authority under this license to receive and bury SNM waste expires on November 30, 1993. Pursuant to NRC regulations, all other conditions shall continue in full force and effect until final NRC action on license transfer or termination has been completed.
37. Unless otherwise specifically authorized by this license, low-level radioactive waste containing SNM shall be received and disposed of in accordance with design construction, site utilization, environmental monitoring, and closure requirements approved by the Department and contained in WN-1019-02, Amendment 17. In

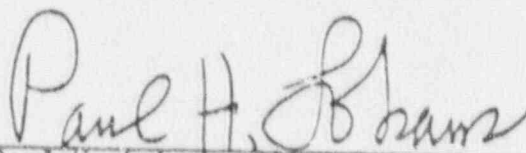
Nine (9).

27-48

particular, the licensee shall comply with Conditions 46, 48, 49, 50, 51, 52, 53, 54, 55, 56, 60, 61, and 62 of WH-1019-02, as enforced by the Department. If the Department is found not to be enforcing license conditions, the conditions shall be enforceable and enforced by and through this license. In such a circumstance, the licensee will be duly notified and will be directed to submit any reports required by these conditions to the Director, Division of Low-Level Waste Management and Decommissioning, NRC.

Dated this 14TH day of June, 1990 in Rockville, MD.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION



Paul H. Lohaus, Chief
Operations Branch
Division of Low-Level Waste Management
and Decommissioning, NMSS

Nine (9)

27-48

APPENDIX A

EXAMPLES OF CONTAINERS MEETING 7A PERFORMANCE SPECIFICATIONS
AND HAVING A HEAVY-DUTY CLOSURE DEVICE*

- Spec. 5B Steel Drum (30 gallon)
- Spec. 6C Steel Drum (5 and 10 gallon)
- Spec. 6J Steel Drum (55 gallon)
- Spec. 42B Aluminum Drum (55 Gallon)
- Spec. 17C Steel Drum (5 gallon)
- Spec. 17C Steel Drum (55 gallon)
- Spec. 17E Steel Drum (55 gallon)
- Spec. 17H Steel Drum (30 gallon)
- Spec. 17H Steel Drum (55 gallon) with 5/8" bolt closure
- Spec. 7A Steel Box (Argonne National Laboratory's Steel Bin)
- Spec. 7A Steel Box (BCL-5 Shipping Container)
- Spec. 7A Steel Box (Type A Steel Box)
- Spec. 7A Steel Box (Follansbee Drum-MS 24347-2)
- Spec. 7A Steel Drum (4 gallon).

* These are merely examples of containers. The waste generator must comply with all Department of Transportation requirements pertinent to the container's selection, use, handling and transportation.

Nine (9)

27-48

APPENDIX B
APPROVED SORBENTS

Only those absorbents listed below have been approved by the Department for general use in packaging and/or processing radioactive liquids or for use with materials that may contain a quantity of liquid that requires absorbing.

Absorbency efficiencies and quantity of absorbent required vary. In all cases, it is the responsibility of the waste generator and/or packager to determine the efficiency and proper proportions of absorbent for liquids being absorbed. Note: Enough absorbent materials must be provided to absorb at least twice the volume of liquid contents.

	<u>Media</u>	<u>Oil</u>	<u>Water</u>
A.	<u>Clay Materials</u>		
	1. Speedi Dri	Approved	Approved
	2. Hi Dri	Not Approved	Approved
	3. Florco	Approved	Approved
	4. Florco X	Not Approved	Approved
	5. Instant Dri	Not Approved	Approved
	6. Safe T Sorb	Not Approved	Approved
	7. Opalex	Approved	Approved
	<i>Clay S.N.S.</i>		
B.	<u>Diatomaceous Earths</u>		
	1. Superfine	Approved	Approved
	2. Floor Dry	Approved	Approved
	3. Celetom	Approved	Approved
	4. Safe N Dri	Approved	Approved
	5. Solid-A-Sorb	Approved	Approved
	<u>Media</u>	<u>Oil</u>	<u>Water</u>
C.	<u>Perlite</u>		
	1. Chemsil 30	Not Approved	Approved
	2. Chemsil 50	Approved	Approved
	3. Chemsil 3030	Approved	Approved
	4. Dicaperl HP200	Approved	Approved
	5. Dicaperl HP500	Approved	Not Approved

Nine (9).

27-48

D. Others

1. Dicalite Dicasorb	Approved	Not Approved
2. Petroset*	Approved**	Approved**
3. Petroset II*	Approved	Not Approved
4. Aquaset*	Not Approved	Approved
5. Aquaset II*	Not Approved	Approved***
6. Safe T Set	Not Approved	Approved

E. Other sorbents as approved by the Department

* The products Aquaset, Aquaset II, Petroset, and Petroset II are exempt from Condition 17b. These products shall be used only without an inner 4 mil plastic liner. Additionally, these products, when used in accordance with the manufacturer's procedures, incorporate the requirement of enough absorbent material to absorb at least twice the volume of radioactive liquid content.

** The product Petroset is primarily used in conjunction with Petroset II or Aquaset II, when a mixture of water and oils are present, and the oils are in excess of five percent of the waste volume. Use of Petroset requires power-mixing equipment.

*** Not for use with pure water.